

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE
in its capacity as elected Office

Date of mailing (day/month/year) 09 July 2001 (09.07.01)	
International application No. PCT/US00/25211	Applicant's or agent's file reference DWH-10652/29
International filing date (day/month/year) 15 September 2000 (15.09.00)	Priority date (day/month/year) 16 September 1999 (16.09.99)
Applicant WHITE, Dawn	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
13 April 2001 (13.04.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Odile ALIU Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

RECEIVED
FEB 15 2002
GIFFORD, KRASS, GROH, SPRINKLE,
ANDERSON & CITKOWSKI, P.C.From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
JOHN G. POSA
GIFFORD, KRASS, GROH, SPRINKLE,
ANDERSON & CITKOWSKI, PC
280 N. OLD WOODWARD AVE., SUITE 400
BIRMINGHAM, MI 48009

PCTNOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing
(day/month/year)

11 FEB 2002

Applicant's or agent's file reference

DWH-10652/29

IMPORTANT NOTIFICATION

International application No.

PCT/US00/25211

International filing date (day/month/year)

15 September 2000 (15.09.2000)

Priority date (day/month/year)

16 September 1999 (16.09.1999)

Applicant

SOLIDICA, INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PC Applicant's Guide.

Name and mailing address of the IPEA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703)305-3230

Authorized officer

Leo Picard

Telephone No. 703-308-0538

Form PCT/IPEA/416 (July 1992)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference DWH-10652/29	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/25211	International filing date (<i>day/month/year</i>) 15 September 2000 (15.09.2000)	Priority date (<i>day/month/year</i>) 16 September 1999 (16.09.1999)
International Patent Classification (IPC) or national classification and IPC IPC(7): G06F 19/00 and US Cl.: 700/117, 118, 119, 120, 121, 122, 123, 182		
Applicant SOLIDICA, INC.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>8</u> sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT)</p> <p>These annexes consist of a total of <u>0</u> sheets.</p> <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 		
Date of submission of the demand 13 April 2001 (13.04.2001)	Date of completion of this report 18 January 2002 (18.01.2002)	
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer <i>James R. Matthews</i> Leo Picard <i>711</i> Telephone No. 703-308-0538	

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/25211

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed.

☒ the description:

pages 1-34 as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of _____

☒ the claims:

pages 35-40, as originally filed

pages NONE, as amended (together with any statement) under Article 19

pages NONE, filed with the demand

pages NONE, filed with the letter of _____

☒ the drawings:

pages 1-10, as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of _____

☐ the sequence listing part of the description:

pages NONE, as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages NONE

☐ the claims, Nos. NONE

☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)

Claims 1-35 YES
Claims NONE NO

Inventive Step (IS)

Claims NONE YES
Claims 1-35 NO

Industrial Applicability (IA)

Claims 1-35 YES
Claims NONE NO

2. CITATIONS AND EXPLANATIONS Please See Continuation Sheet

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

V. 2. Citations and Explanations:

1. Claims 28-30, 33 lack an inventive step under PCT Article 33(3) as being obvious over **Crump** (U.S. Pat. No. 5,121,329) in view of **Fell** (U.S. Pat. No. 5,252,163).

Crump disclose a system for fabricating an object using sequential material deposition, comprising:

a memory for storing a description of the object, (Fig. 2, elements 36 and 40; Col. 5, lines 45-50, i.e., It is inherent that the CAD software would have a memory for storing the description of the object);

a material feeder for providing material increments with faying surfaces therebetween, (Figs. 4, 5 and 10);

a controller operative to coordinate the addition of successive layers through the material feeder and control the source of ultrasonic vibrations to consolidate the layers in accordance with the description of the object, (Fig. 2, element 44; Col. 10, lines 59-64);

an actuation system for imparting relative motion between the material feeder and energy source, (Figs. 2 and 10; Col. 14, lines 64-68; Col. 15, lines 1-13)

However, **Crump** fail to disclose:

a source of energy operative to produce an atomically clean faying surface between the material increments without melting the material in bulk;

the process used to form the object involves ultrasonic, electrical resistance or frictional consolidation.

But, **Fell** discloses such limitations as follows:

a source of energy operative to produce an atomically clean faying surface between the material increments without melting the material in bulk, (Col. 17, lines 35-45);

the process used to form the object involves ultrasonic, electrical resistance or frictional consolidation, (Col. 11, lines 6-11 and lines 33-38; col. 17, lines 35-45)

Therefore, it would have been obvious to a person of the ordinary skill in the art at the time the invention was made to have combined the teachings of **Crump** et al. with the teachings of **Fell** because it would improve the manufacturing of 3-D objects by implementing

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

ultrasonic consolidation as taught by Fell and thereby avoiding the steps of melting the materials prior to fabrication.

2. Claims 31-34 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Feygin et al. (U.S. Pat. No. 5,637,175).

Crump et al. and Fell disclose the limitations of claim 28 above and Crump et al. further disclose the feeder is operative to provide the material in the form of sheets, tapes, filaments, dots or droplets, (Col. 5, lines 62-63, i.e. different forms of materials; Col. 9, lines 30-31; Fig. 3, element 46);

But Crump et al. and Fell fail to disclose:

a material-removing unit for removing any excess material not required to form the object;

the material-removing unit includes a knife, drill, laser beam, milling machine or ultrasonic machining tool;

a support-material feeder and a support-material removing unit for removing excess support material not required to form the object;

However, Feygin et al. disclose such limitations as follows:

a material-removing unit for removing any excess material not required to form the object, (Col. 9, lines 60-65; Col. 28, lines 37-40);

the material-removing unit includes a knife, drill, laser beam, milling machine or ultrasonic machining tool, (Col. 28, 40-41, i.e. laser);

a support-material feeder, (Col. 11, lines 48-50); and a support-material removing unit for removing excess support material not required to form the object (Col. 9, lines 66-67 and Col. 10, lines 1-3).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Crump et al. and Fell with the method of Feygin et al. because such combination would allow to provide a new and improved method for manufacturing a three dimensional object from laminations formed in shapes required for assembly in a preselected sequence, (Feygin et al., Col. 5, lines 20-24).

3. Claim 35 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in paragraph 2 above and further in view of Mehta et al. (U.S. Pat. No. 4,743,733).

Crump et al., Fell and Feygin et al. disclose the limitations of claims 28 and 31 above but fail to disclose the object is a repair to an existing article. However, Mehta et al. teach such limitation, (Abstract, lines 1-6). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have combined the teachings of Crump et al. and Feygin et al. with the repairing method of Mehta et al. because it would provide with an improved method for repairing a damaged metallic portion of an article to recreate its original configuration and material, (Mehta et al. Col. 1, lines 34-37).

4. Claims 1-7, 10-16, 18-21 and 23-26 lack an inventive step under PCT Article 33(3) as being obvious over Crump (U.S. Pat. No. 5,121,329) in view of Fell (U.S. Pat. No. 5,252,163) and further in view of Feygin et al. (U.S. Pat. No. 5,637,175).

Crump et al. disclose:

a method of fabricating an object through ultrasonic consolidation, comprising the steps of-
providing a description of the object to be fabricated, (Col. 5, lines 45-46; Fig. 2, elements 40 and 36);
providing a material feedstock, (Col. 1, line 9);

forming the object by consolidating material increments in accordance with the description, (Col. 15, lines 2-10; Col. 3, lines 38-50);

the material layers are composed of sheets, elongated tapes, filaments, dots or droplets (Col. 5, lines 62-63, i.e. different forms of materials; Col. 9, lines 30-31; Fig. 3, element 46);

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

material increments define a discontinuous or gradual change in material composition, (Col. 3, lines 16-20, i.e. there is a gradual change in material composition from liquid to solid);

the description of the object is provided in the form of a computer-aided design or manufacturing (CAD/CAM) file, (Fig. 2, element 36);

the object includes an overhanging, cantilevered or enclosed feature; and support material is used to support the feature, (Col. 15, lines 13-20; Fig. 10).

the support material has a melting point which is different than the material used to form the object, (Col. 5, lines 62-68);

the support material is an alloy including solders, copper-based brazes, nickel-based brazes or titanium-based brazes, (Col. 6, lines 1-10)

providing a computer-controlled actuation system operative to automatically place the material layers in position prior to consolidation, (Fig. 2, Col. 3, lines 38-50);

However, Crump et al. do not disclose:

using a process that produces an atomically clean faying surface between the increments without melting the material in bulk;

the process used to form the object involves ultrasonic, electrical resistance or frictional consolidation;

the process passes the energy through the material increment during the deposition thereof;

But, Fell discloses such limitations as follows:

using a process that produces an atomically clean faying surface between the increments without melting the material in bulk, (Col. 17, lines 35-45);

the process used to form the object involves ultrasonic, electrical resistance or frictional consolidation, (Col. 11, lines 6-11 and lines 33-38; col. 17, lines 35-45)

the process passes the energy through the material increment during the deposition thereof, (Col. 17, lines 41-45);

Therefore, it would have been obvious to a person of the ordinary skill in the art at the time the invention was made to have combined the teachings of Crump et al. with the teachings of Fell because it would improve the manufacturing of 3-D objects by implementing ultrasonic consolidation as taught by Fell and thereby avoiding the steps of melting the materials prior to fabrication.

Crump et al. and Fell disclose some of the limitations of claim 1 above but fail to disclose:

removing any excess material

the material is provided in the form of thin layers, and one or more of the layers are cut into a shape corresponding to the description of the object prior to the step of consolidating the layer;

alternating layers of reinforcement fibers and metallic powders, foils, or a combination thereof, are used to fabricate a metal-matrix composite object;

the step of at least partially consolidating the metallic powder through laser-aided heating;

the fibers are continuous ceramic fibers;

the object is a fiber-reinforced composite tape;

the reinforcement fiber cross each other in successive layers for added strength;

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(To be used when the space in any of the preceding boxes is not sufficient)

the support material is cut and placed to ensure that it can be shaken or otherwise easily removed from the object being fabricated;

the support material is applied as a liquid, but hardens to produce a rigid support structure;

slip-cast ceramics, freeze-cast ceramics, solgels, or hard, sufficiently high-melting point waxes are used as the support material;

However, Feygin et al. teach such limitations as follows:

removing any excess material, (Col. 9, lines 60-65);

the material is provided in the form of thin layers, and one or more of the layers are cut into a shape corresponding to the description of the object prior to the step of consolidating the layer, (Col. 6, lines 50-65, i.e. cross sections are cut by a laser beam; the cross-sections can be formed on the object or separately);

alternating layers of reinforcement fibers and metallic powders, foils, or a combination thereof, are used to fabricate a metal-matrix composite object, (Col. 7, lines 53-54; Col. 16, lines 53-65);

the step of at least partially consolidating the metallic powder through laser-aided heating, (Col. 2, lines 25-29);

the fibers are continuous ceramic fibers, (Col. 27, 40-45, i.e. ceramic tapes);

the object is a fiber-reinforced composite tape, (Col. 27, lines 40-54);

the reinforcement fibers cross each other in successive layers for added strength, (Col. 22, lines 32-34);

the support material is cut and placed to ensure that it can be shaken or otherwise easily removed from the object being fabricated, (Col. 10, lines 12-16);

the support material is applied as a liquid, but hardens to produce a rigid support structure, (Col. 9, lines 53-56);

slip-cast ceramics, freeze-cast ceramics, solgels, or hard, sufficiently high-melting point waxes are used as the support material, (Col. 3, line 10 and line 13; Col. 12, line 39);

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Crump et al. and Fell with the method of Feygin et al. because such combination would allow to provide a new and improved method for manufacturing a three dimensional object from laminations formed in shapes required for assembly in a preselected sequence, (Feygin et al., Col. 5, lines 20-24).

5. Claims 8, 9, 17, and 22 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in paragraph 4 above and further in view of Brennecke et al. (U.S. Pat. No. 5,817,199).

Crump et al., Fell and Feygin et al. disclose the limitations of claim 1 and 18 above but fail to disclose

the material is provided in the form of thin layers, and one or more of the layers are consolidated then trimmed in accordance with the description of the object;

the material is provided in the form of a plurality of thin layers which are consolidated one layer at a time;

the material is provided in the form of a tape having a width; and the description of the object takes the width of the tape into account;

the support material is roughened through mechanical or chemical processing;

However, Brennecke et al. disclose such limitations as follows:

the material is provided in the form of thin layers, and one or more of the layers are consolidated then trimmed in accordance with the description of the object, (Col. 1, lines 47-49; i.e., it is inherent that the webs are trimmed after being bonded);

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US00/25211

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

the material is provided in the form of a plurality of thin layers which are consolidated one layer at a time, (Col. 1, line 62-67);

the material is provided in the form of a tape having a width; and the description of the object takes the width of the tape into account, (Fig. 1, elements 36A, 36C; Col. 9, lines 62-67);

the support material is roughened through mechanical or chemical processing, (Fig. 5; Col. 11, lines 8-12);

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Crump et al., Fell and Feygin et al. with the method of Brennecke et al. because it would provide an efficient ultrasonic bonding method wherein a batt of bondable material such as fiber can be consolidated by ultrasonic bonding with rotary ultrasonic horns to form a unitary web, (Brennecke et al, Abstract, lines 25-27).

6. Claim 27 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in paragraph 4 above and further in view of Mehta et al. (U.S. Pat. No. 4,743,733).

Crump et al., Fell and Feygin et al. disclose the limitations of claim 1 above but fail to disclose the object is a repair to an existing article. However, Mehta et al. teach such limitation, (Abstract, lines 1-6). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have combined the teachings of Crump et al. and Feygin et al. with the repairing method of Mehta et al. because it would provide with an improved method for repairing a damaged metallic portion of an article to recreate its original configuration and material, (Mehta et al. Col. 1, lines 34-37).

----- NEW CITATIONS -----

PATENT COOPERATION TREATY JAN 02 2000

RECEIVED
GIFFORD, KRASS, GROH, SPRINKLE,
ANDERSON & CITKOWSKI, P.C.

From the INTERNATIONAL SEARCHING AUTHORITY

To: JOHN G. POSA
GIFFORD, KRASS, GROH, SPRINKLE,
ANDERSON & CITKOWSKI, PC
280 N. OLD WOODWARD AVE., SUITE 400
BIRMINGHAM, MI 48009

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference DWH-10652/29	Date of Mailing (day/month/year) 28 DEC 2000
International application No. PCT/US00/25211	International filing date (day/month/year) 15 SEPTEMBER 2000
Applicant SOLIDICA, INC.	

*Response out 1-28-01
due 2-28-01*

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.
 Filing of amendments and statement under Article 19:
 The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.
 Where? Directly to the International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland
 Facsimile No.: (41-22) 740.14.35
 For more detailed instructions, see the notes on the accompanying sheet.
2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.
3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.
4. Further action(s): The applicant is reminded of the following:
 Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in rules 90 bis 1 and 90 bis 3, respectively, before the completion of the technical preparations for international publication.
 Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).
 Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer WILLIAM GRANT <i>James R. Matthews</i> Telephone No. (703) 308-1108
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PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To: JOHN G. POSA
GIFFORD, KRASS, GROH, SPRINKLE,
ANDERSON & CITKOWSKI, PC
280 N. OLD WOODWARD AVE., SUITE 400
BIRMINGHAM, MI 48009

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference DWH-10652/29	Date of Mailing (day/month/year) 28 DEC 2000
International application No. PCT/US00/25211	International filing date (day/month/year) 15 SEPTEMBER 2000
Applicant SOLIDICA, INC.	

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Further action(s): The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in rules 90 bis 1 and 90 bis 3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer WILLIAM GRANT <i>James R. Matthews</i> Telephone No. (703) 308-1108
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference DWH-10652/29	FOR FURTHER ACTION <small>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.</small>	
International application No. PCT/US00/25211	International filing date (<i>day/month/year</i>) 15 SEPTEMBER 2000	(Earliest) Priority Date (<i>day/month/year</i>) 16 SEPTEMBER 1999
Applicant SOLIDICA, INC.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:
☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (See Box II).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☐ the text is approved as submitted by the applicant.
- ☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No. 5

- ☒ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.
- ☐ None of the figures.

Box III TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

NEW ABSTRACT

A system and a method of fabricating a three-dimensional object consolidates material increments in accordance with a description of the object using a process that produces an atomically clean faying surface between the increments without melting the material in bulk. The CAD system (60) interfaces with a numerical controller (70), which controls and actuation system. The actuation system brings the support feed unit (62), the support ultrasonic welding unit (66), the object feed unit (64) and the object ultrasonic welding unit (68) into proper position in the work area (75), so that the ultrasonic consolidation of the layers takes place according the the CAD description of the object. In alternative embodiments, electrical resistance, and frictional methodologies are used for object consolidation. The invention further facilitates the construction and repair of dense objects, including fiber-reinforced composites and aerospace structures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/25211

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 19/00

US CL :700/119, 123

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 700/117, 118, 119, 120, 121, 122, 123, 182

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,121,329 A (CRUMP) 09 June 1992 (09.06.1992), Whole document	1-35
Y	US 5,637,175 A (FEYGIN et al.) 10 June 1997 (10.06.1997), Whole document	1-35
A	US 5,945,058 A (MANNERS et al.) 31 August 1999 (31.08.1999), Col. 1, 2, 3, 4, 5, 6, 7 and 8	1-35



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

28 NOVEMBER 2000

Date of mailing of the international search report

28 DEC 2000

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

WILLIAM GRANT

James R. Matthews

Telephone No. (703) 308-1108

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 14 FEB 2002

V/IPO

PCT

Applicant's or agent's file reference DWH-10652/29		FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/25211	International filing date (day/month/year) 15 September 2000 (15.09.2000)	Priority date (day/month/year) 16 September 1999 (16.09.1999)	
International Patent Classification (IPC) or national classification and IPC IPC(7): G06F 19/00 and US Cl.: 700/117, 118, 119, 120, 121, 122, 123, 182			
Applicant SOLIDICA, INC.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>8</u> sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>0</u> sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand 13 April 2001 (13.04.2001)		Date of completion of this report 18 January 2002 (18.01.2002)	
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230		Authorized officer <i>James R. Matthews</i> Leo Picard Telephone No. 703-308-0538	

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US00/25211

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed.

☒ the description:

pages 1-34 as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of _____

☒ the claims:

pages 35-40 as originally filed

pages NONE, as amended (together with any statement) under Article 19

pages NONE, filed with the demand

pages NONE, filed with the letter of _____

☒ the drawings:

pages 1-10 as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of _____

☐ the sequence listing part of the description:

pages NONE as originally filed

pages NONE, filed with the demand

pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item. These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages NONE

☐ the claims, Nos. NONE

☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US00/25211

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)

Claims 1-35 YES

Claims NONE NO

Inventive Step (IS)

Claims NONE YES

Claims 1-35 NO

Industrial Applicability (IA)

Claims 1-35 YES

Claims NONE NO

2. CITATIONS AND EXPLANATIONS

Please See Continuation Sheet